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Using data obtained from opinion questionnaires and standardized tests of educational development, attitudes, and critical thinking, a study was made in 1968 to test the findings of a 1965 study of students and teachers in two high schools--one experimental and one control--in the same school system in Colorado. Approximately 500 students were enrolled in the experimental school, which practiced modular scheduling, and 1300 in the control school. In addition to general problems of the total program, questionnaire items covered practices and problems of large group sessions, small group sections, supervised study, and unscheduled time. Analysis of the study's findings indicated that the experimental school's use of the modular schedule in 1968 was more consistent with expected practices than in 1965. The modular scheduling program was favorably received by both students and teachers. Except for critical thinking, students at the experimental school showed growth in academic achievement as well as or better than students in the control school. (JK)

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RESEARCH PAPERS

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No. 19

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An Evaluation of the Educational Program of a High School Using a Modular Schedule: A Follow-Up Study

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September, 1968

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An Evaluation of the Educational Program of a High School Using a Modular Schedule: A Follow-up Study

During the 1964-65 school year, Broomfield High School (Broomfield, Colorado) inaugurated the modular system in its high school program. A macro-study (Speckhard, 1966) of the educational effects of this innovation was conducted during the final months of its first year of operation and the beginning months of the following year. The report of this study (hereafter referred to as the 1965 Study) included: (a) the background of the modular schedule, (b) the rationale for its use, (c) a detailed description of the specific program adopted at Broomfield, (d) the rationale for evaluation, (e) the instruments used and procedures for administration and analysis, and (f) the results of the study and conclusions and recommendations.

The present paper is a report of a follow-up evaluation which was conducted during April 1968 and does not include much of the information reported in the 1965 Study. Reference to the 1965 Study is made only when referring to modifications of instruments used in that study or when making comparisons of the results of the two evaluations. We are including, however, a summary of the results and conclusions of the 1965 Study.

RESULTS OF THE 1965 STUDY

The results of the questionnaires disclosed that some of the practices advocated by proponents of modular scheduling were carried on in the experimental school while some were not. The problems reported most frequently involved the use of small group sections and unsupervised study time. Low achievers generally reported having more problems in using the system than did average and high achievers. Sophomores reported problems more often than did juniors or seniors.

Although some problems were reported, both students and teachers generally expressed approval of the modular system. A large majority of both groups were of the opinion that students were learning as well as, or better than, they would have under a more traditional schedule. A comparison of standardized test data with a control school supported this contention.

The analysis of the test results showed that the students in the experimental school had developed a significantly higher ability in critical thinking, as measured by the Watson-Glaser Critical Thinking Appraisal, than had the students in the control school. Neither school demonstrated any superiority over the other on the Brown-Holtzman Survey of Study Habits and Attitudes. Growth in academic achievements, as measured by the Iowa Tests of Educational Development battery, during the first year of high school (sophomore) at the experimental school was superior to growth at the control school during the same period. The results were statistically

significant on six of the nine subtests and the composite score. Growth in academic achievement during the second year of high school (junior) was not significantly different for the two schools. On only one subtest was a significant difference obtained, this in favor of the control group. When the data were analyzed together for sophomores and juniors only one subtest (ability to interpret reading materials in the social studies) showed a significant difference, this in favor of the experimental school.

Since relatively few significant interactions were found for any of the tests, it can be concluded that the effects of the two educational programs were not different for boys and girls and for students at varying achievement levels.

The following conclusions were drawn from the results of the 1965 Study:

a. Both the students and the teachers at the experimental school generally approved of modular scheduling and felt that the students learned as well as, or better than, they would have in a school with a traditional schedule.

b. Modular scheduling, as practiced by the experimental school, can lead to greater student ability in critical thinking and to greater student ability to interpret reading materials in the social studies.

c. The adoption of a modular schedule by a high school, necessitating new practices for students and teachers, can be done without adversely affecting the attitudes of students and teachers.

d. Modular scheduling, as practiced by the experimental school, does not necessarily lead to improved study habits and attitudes.

e. The effect of modular scheduling, as practiced by the experimental school, on growth in academic achievement is equal to or greater than the effect of a more traditional schedule. It is possible, judging from the different pattern of test results for sophomores and juniors, that the effect of a modular schedule is greater for high school students without previous high school experience (sophomores) than for students who previously attended a traditional high school (juniors).

f. Modular scheduling, as practiced by the experimental school, results in more individualization of instruction than does a more traditional schedule.

g. Schools adopting the modular system will need to make efforts to insure that all students, particularly low achievers, are aided in using the opportunities created by the system.

h. Modular scheduling does create unique, but not necessarily greater, problems than those found in schools with a traditional schedule. To use the modular system effectively, orientation and in-service programs are needed to help teachers adapt to their new roles.

Since the 1965 Study was conducted during the first year and a half of the operation of the modular schedule at Broomfield High School, it was suggested at that time that "follow-up studies in the experimental school are recommended to determine if achievement patterns, and the high degree of student and teacher acceptance, are maintained in the succeeding years." Consistent with this recommendation, a follow-up evaluation was conducted in April 1968. This evaluation also has the advantage of investigating the cumulative effect of a modular system, i.e., the effect for students who have attended the experimental school for all three years.

RATIONALE OF THE MODULAR SYSTEM

The rationale of the modular system, described in some detail by Speckhard (1966), is briefly reviewed here. Generally speaking, the modular system makes two unique contributions to a school's program: (a) time variations, and (b) instructional group size variations. Theorists claim that, if properly used, these variations can create more opportunities for improving the educational program. Briefly, these are:

Large Group Instruction

a. more effective use of outside resources
b. more effective use of audio-visual materials
c. additional time for teacher preparation
d. additional time for teachers to work with individual students

Small Group Instruction

a. more effective student-teacher interaction
b. more effective student-student interaction
c. more effective student activities
d. more effective analytical and exploratory discussion

Individual Study

a. more effective use of learning materials and resources
b. more effective individualization of instruction
c. more effective study of course topics in depth
d. more effective study of topics beyond curriculum
e. additional time for student-student interaction

Advocates claim that capitalization on these opportunities will lead to greater achievement of certain educational goals. Illustrative of the hypothesized claims are that students in a modular system will:

a. develop greater individual self-direction and self-responsibility,
b. improve study skills and attitudes,
c. develop greater ability to think critically, and
d. attain greater academic achievement.

One of the purposes of both the 1965 Study and the 1968 Follow-up Study was to determine if these goals were being realized. Another purpose was to provide the experimental school with feedback concerning the practices and problems in its use

of the modular system. In addition, the opinions of students and teachers about the effectiveness of the modular system were obtained to aid in the improvement of practices at the experimental school.

GENERAL RESEARCH DESIGN

The research methods used in both the 1965 and 1968 Studies were designed to answer the following questions:

a. To what extent do the teachers and students in the modular system capitalize on their respective opportunities to improve the educational program? Does this utilization of opportunities vary for students of different aptitude and sex?

b. What are some of the problems that reduce the effectiveness or discourage the utilization of these opportunities? Do these problems vary for students of different aptitude and sex?

c. To what extent do the students and teachers feel that the modular system improves the educational program? Do these opinions vary for students of different aptitude and sex?

d. To what extent have the students in the modular system achieved the purported educational goals? Do students in a school with a modular system achieve more than those in a school with a traditional schedule? Are these achievements realized relatively more by students of a specified level of aptitude and/or sex?

The data for the 1965 Study were obtained with the use of questionnaires, classroom observations, interviews, and standardized tests. Since the classroom observations and interviews were used to validate the questionnaire results (which they did to a very high degree), only the questionnaires (slightly modified) and the standardized tests of the 1965 Study were used in the follow-up evaluation. (See Speckhard, 1966 for a discussion of the rationale for the development of the questionnaires.) Several additional instruments were also used in this follow-up study: (a) My High School; (b) Education Scale VII; and (c) Biographical Data Form. The rationale for the development and the description and use of each of these instruments are discussed in a later section of this paper.

DESCRIPTION OF THE EXPERIMENTAL AND CONTROL SCHOOLS

For the purposes of comparing results on the standardized tests and the My High School opinionnaire, the same control school as was used in 1965 was used again for this study. The 1965 Study provided evidence of strong similarities between the two schools in student population, course offerings, school plant and equipment, level of student ability and achievement, and proportion of students planning to attend college. The most obvious difference between the two schools is the size of the student body, approximately 500 students at the experimental school and 1300 students at the control school.

Comparison of Teaching Staffs

No attempt was made in the 1965 Study to compare the teaching staffs at the two schools. Since both schools are in the same school district and teachers are employed and assigned by the central office, it was assumed in 1965 that variations in teaching abilities were similar for the two schools. By 1968 the modular system had been in operation for three years, and it was felt that this assumption might no longer be tenable for the present evaluation. Thus two instruments were administered to the teachers of both schools to test if recruitment practices during the past three years had led to certain differences between the teaching staffs. The first, a Biographical Data Form, gathered information about the age, sex, preparation, and teaching experience of each teacher. Table I gives the means, standard deviations, and t tests for the difference between the means of the two schools for seven of the items in the Biographical Data Form.

TABLE I

MEANS, STANDARD DEVIATIONS AND t TESTS FOR ITEMS IN THE BIOGRAPHICAL DATA FORM FOR THE EXPERIMENTAL AND CONTROL SCHOOLS

	EXPERIMENTAL (N=33)		CONTROL (N=66)		
ITEM	MEAN	S.D.	MEAN	S.D.	t
1.	3.00	1.44	3.17	1.51	- .65
2.	1.36	.49	1.55	.50	-1.73
3.	3.79	1.80	3.92	2.21	- .30
4.	3.36	2.61	2.95	2.18	.82
5.	5.15	1.39	4.74	1.43	1.37
7.	6.42	2.54	6.92	2.17	-1.02
8.	5.43	1.45	5.09	1.70	.97

The difference between the means for the two schools for each of the seven items was analyzed with a t test, and the results showed that there was no significant difference between the two teaching staffs.

Item #1 gives the mean of the ages of teachers at the two schools. At both schools the teachers on the average are about 30-34 years of age.

Item #2 gives the mean for sex when male equals "1" and female equals "2". The experimental school has a slightly higher proportion of male teachers than does the control school but not significantly so.

Item #3 refers to the number of years employed in the education profession. The means for both schools are about five to six years.

Item #4 refers to the years employed at the respective schools. The means for both schools are about three years.

Item #5 reports the level of collegiate preparation. At both schools the teachers on the average have a B.A. degree plus 20-30 semester credits.

Item #7 refers to the percent of classes in each teacher's major field of preparation. On the average, for both schools approximately 61-80 percent of each teacher's classes are in his major field of preparation.

Item #8 reports the number of credits of course work taken in each teacher's major field of preparation. For both schools the average number of course credits is 51-60.

The second instrument which was administered to the teachers was the Education Scale VII, which was developed by Dr. Fred N. Kerlinger (Kerlinger and Pedhazur, 1967). This scale measures attitudes toward education on a continuum from "agree very strongly" to "disagree very strongly." For scoring and analyzing the results, certain items are scored for progressive attitudes (A items), and other items are scored for traditional attitudes (B items). Three scores were computed for each teacher: A, B, and A-B. If the A-B score is positive, the teacher is interpreted to have progressive attitudes toward education. If the A-B score is negative, the teacher is interpreted to have traditional attitudes toward education.

Table II gives the A, B, and A-B means for the teachers at both schools.

TABLE II

MEANS AND STANDARD DEVIATIONS OF SCORES ON EDUCATION SCALE VII FOR TEACHERS AT THE EXPERIMENTAL AND CONTROL SCHOOLS

	EXPERIMENTAL (N=33)		CONTROL (N=67)	
SCORE	MEAN	S.D.	MEAN	S.D.
A (Progressive)	84.15	7.91	83.03	10.33
B (Traditional)	60.88	13.96	62.12	12.35
A-B	23.27	16.70	20.91	16.61

The mean scores suggest that on the average the teachers at both schools have progressive attitudes toward education. A t test showed no significant difference between the A-B means of the two schools (t=.659).

The analysis of the results of the Biographical Data Form and the Education Scale VII lend support to the assumption made in the 1965 Study that the teaching staffs at the two schools are similar.

DESCRIPTION OF THE TESTS AND QUESTIONNAIRES

Modular Schedule Questionnaires

For the 1965 Study, questionnaires were administered to all the students at the experimental high school. The questionnaire, which for the most part dealt with unique aspects of the modular system, was divided into five parts: large group instruction, small group instruction, supervised study, unsupervised study, and the over-all program. Within each of these five parts the items were designed (a) to assess the frequency of certain practices by students and teachers, (b) to ascertain the extent to which certain problems exist, and (c) to obtain opinions about the value of certain aspects of the modular system.

A separate questionnaire was designed for teachers. Its structure was the same as that of the student questionnaire, and most of the items were identical. Variations in items occurred where it did not appear that both teachers and students could make valid responses. Such items on the teacher questionnaire were related to practices and problems about which students usually are not aware.

Some modifications were made in the questionnaires for the 1968 evaluation. Open-ended questions were deleted because it was found that they did not contribute significant additional information in the previous study. The number of response choices was increased to provide the student with a broader range of responses. Some of the items were deleted because they required the student to make comparisons with his high school life before the modular schedule was adopted, an impossibility for most students in 1968 since they had spent all of their high school years at a school with a modular schedule.

As in 1965, the questionnaires were administered to all students in the experimental school. The chi-square technique was used in the 1965 Study to test for differences in responses between boys and girls, between students in three achievement levels, and between students and teachers. For the present evaluation, item responses were analyzed with a factorial design with analysis of variance. This procedure was employed because it provides a more powerful analysis of the data, and computing facilities and programs were conveniently available.

My High School Opinionnaire

Many modular schedule practitioners have held that the effective use of the modular system leads to more favorable attitudes toward school programs and practices. The 1965 Study showed that the students did accept the modular system at Broomfield to a high degree. For this follow-up evaluation, the contention that students in a modular system like Broomfield's have favorable attitudes toward their education was investigated by comparing the attitudes at the experimental school with the attitudes of students at the control school.

The My High School opinionnaire includes twenty-five positive statements which attempt to measure the students' attitudes toward their high school education. The item responses range on a continuum from "agree very strongly" to "disagree very strongly," and are scored so that a higher value reflects a more favorable attitude.

Standardized Tests

Three standardized tests were administered to the seniors at both the experimental and control schools. They were:

a. Iowa Tests of Educational Development (ITED)
b. Brown-Holtzman Survey of Study Habits and Attitudes
c. Watson-Glaser Critical Thinking Appraisal

The ITED battery was used to compare the academic achievement of the seniors at the two schools. The nine subtests in the battery are:

1. Understanding of Basic Social Concepts
2. Background in the Natural Sciences
3. Correctness and Appropriateness of Expression
4. Ability to Do Quantitative Thinking
5. Ability to Interpret Social Studies Materials
6. Ability to Interpret Reading Materials in the Natural Sciences
7. Ability to Interpret Library Materials
8. General Vocabulary
9. Use of Sources of Information

The Brown-Holtzman Survey of Study Habits and Attitudes was used to determine if modular scheduling leads to improved study habits and attitudes as proposed by theorists supporting the modular system. The Watson-Glaser Critical Thinking Appraisal was used to measure the effect of the modular system on critical thinking.

PROCEDURES FOR THE ADMINISTRATION OF THE TESTS AND QUESTIONNAIRES

All of the instruments used for this evaluation were administered to the students and teachers in April 1968. The outline below shows the group to which each instrument was administered.

Instrument	Administered to
Modular Schedule Questionnaire: Students	All students at Broomfield
Modular Schedule Questionnaire: Teachers	All teachers at Broomfield
Iowa Tests of Educational Development	Seniors at Broomfield and control school
Brown-Holtzman Survey of Study Habits and Attitudes	Seniors at Broomfield and control school
Watson-Glaser Critical Thinking Appraisal	Seniors at Broomfield and control school
My High School Opinionnaire	Seniors at Broomfield and control school

Each of the standardized tests and the My High School opinionnaire was given to only half of the seniors at the control school. Since the senior class at the control school was about twice as large as the Broomfield class, the seniors at the control school were randomly divided into two groups, and each group took half of the tests. This procedure facilitated the administration of the tests at the control

school because the testing room could comfortably accommodate about half of the seniors at one time. This procedure also had the effect of making the sample size for each test nearly comparable at the two schools. The tests administered to the two senior groups at the control school were:

Group I	Group II
Brown-Holtzman	Watson-Glaser
My High School	Iowa Test 5
Iowa Test 1	Iowa Test 6
Iowa Test 2	Iowa Test 7
Iowa Test 3	Iowa Test 8
Iowa Test 4	Iowa Test 9

PROCEDURES FOR STATISTICAL ANALYSIS

All of the standardized tests were analyzed with the analysis of covariance. Scores from grade 9 for the Lorge-Thorndike Intelligence Test were used as the covariate for the analysis of the Survey of Study Habits and Attitudes and the Critical Thinking Appraisal. Two covariates were used for the analysis of each of the nine subtests in the ITED battery: (a) scores from grade 9 for the ITED composite score; and (b) scores from grade 9 for the subtest corresponding to the subtest being analyzed.

A 2x3x2 factorial design was employed for the standardized tests where the factors were (a) the two schools (treatment effects), (b) three ability levels (low, middle, and high), (c) and the two sexes. The ability level for each student was obtained from his Lorge-Thorndike Intelligence Test score. The ability groups were defined as follows:

I.Q.	Level
less than 110	Low
110-120	Middle
more than 120	High

This factorial analysis, in addition to comparing the experimental school with the control school, has the advantage of analyzing if the treatment effects are consistent over all ability levels and for both sexes.

The students' responses to the My High School opinionnaire were analyzed with a 2x3x2 factorial design with analysis of variance. The factors in the design were the same as for the analyses of test results.

The analysis of the Modular Schedule Questionnaire for the students was performed with a 3x3x2 factorial analysis of variance. The factors in this design were (a) the three grade levels (10, 11, and 12), (b) the three ability groups (as defined above), and (c) the two sexes. This analysis was performed for each of the items in the student questionnaire to determine if there were differences in the perceptions of practices and problems among grade levels, ability groups, and the two sexes.

For the items which are common to both the student questionnaire and the teacher questionnaire, the mean of the teachers' responses was compared to the average response of the students with a *t* test. Because of the large number of analyses and the relative instability of individual questionnaire items, a large number of statistically significant results could have been obtained by chance. Thus we have been cautious in interpreting significant findings and have reduced the probability of making a Type I error by attaching significance only to consistent patterns of results. The .01 level of significance was adopted for main effects and the .001 level for interactions.

RESULTS OF THE MODULAR SCHEDULE QUESTIONNAIRE

The results for each of the ten parts of the modular schedule questionnaire have been translated into their implications for the educational program at Broomfield. In addition to the significant main effects and interactions, the comparison between the students' and the teachers' responses will be reported. (cf., Tables III-VII in Appendix)

Large Group Sessions: Practices

The first thirteen items in the questionnaire are related to practices which might be carried on in large group sessions. The possible responses for each item are: (7) always, (6) almost always, (5) more than half the time, (4) about half the time, (3) less than half the time, (2) rarely, and (1) never.

Practices, according to the students, that occurred most often were lecturing (6.00) and use of the overhead projector (5.17) although the projector was used somewhat less with the senior classes. Students were permitted to ask questions "about half the time" (2.89). Practices that occured "rarely" to "less than half the time" were:

(a) bring in outside speakers (2.09),
(b) teacher gives a demonstration (2.36),
(c) teacher lets class study (2.26),
(d) use of films or filmstrips (2.80),
(e) use of TV, radio, or phonograph (2.09),
(f) use of demonstration charts and graphs (2.75),
(g) teacher carries on a general discussion with students (2.60),
(h) students make presentations (2.37), and
(i) variation in presentation from session to session and during sessions, (2.89).

Some interactions ($p < .001$) indicated that there were some variations in type of presentations for students at different grade levels, different sexes, and different ability levels. These variations are understandable as educational practice. An examination of the means of the subgroups indicated that the differences were not radical, i.e., the range of the means for the subgroups varied at the most less than one step on the seven-step scale.

The teachers' perceptions agreed with those of the students on ten of the thirteen items. The practices for which student-teacher differences ($p < .001$) were found are:

a. teachers thought they lectured less often than students did,
b. teachers thought they used the overhead projector less often than students did, and
c. teachers perceived themselves using a greater variety of teaching methods within sessions than students did.

For the question, "How many of the students in your large group sessions regularly pay attention to the presentations?," both students and teachers agree that "most" of the students pay attention, though the number reported is fewer for juniors and seniors than for sophomores.

Large Group Sessions: Problems

Items 14-21 refer to problems which might be encountered by students in large group sessions. The responses for this section included the following choices: (5) it is no problem, (4) it is a minor problem, (3) it is somewhat of a problem, (2) it is a definite problem, (1) it is a major problem. A high score is interpreted to mean that the problem is minor and a low score suggests the problem is major. The values in parentheses are group means for the items.

The "large number of students in the large group sessions," and "not being able to see or hear well," were reported as very minor problems by the students (all group means were about 4.00 or higher). "Not being able to ask questions or have discussion" was reported generally as a minor problem (3.73).

Considered to be "somewhat of a problem" were the following:

a. the distractions caused by some students due to the large size of the session (3.33),
b. the teacher goes too fast (3.20), and
c. not enough variations in the activities (3.00).

The lack of variation in activities during the sessions was the problem of greatest degree to the student; most of the subgroup means were in the "somewhat of a problem" interval with a couple means tending toward the "definite problem" interval.

Variation in the degree of the problems was very small among the subgroups of students, but the low ability students generally reported the problems to be slightly greater, particularly for the problems related to the large size of the group.

Teachers and students agreed on all items except item 17. Teachers thought that distractions caused by the size of the group was less of a problem than did the students (teachers = 4.07; students = 3.33).

The teachers, for items unique to their questionnaire, reported several minor problems for large group sessions:

a. the large variation in student abilities (3.50),
b. holding the attention of a large number of students (3.64), and
c. time to prepare adequately or get materials ready (3.39).

Small Group Sections: Practices

Items 22-32 asked the students to report the frequency of eleven different practices during the small group sections. As before, high scores reflect a large frequency and low scores reflect a small frequency: (7) always, (6) almost always, (5) more than half the time, (4) about half the time, (3) less than half the time, (2) rarely, and (1) never. Group means given in the succeeding discussion should be interpreted according to this continuum.

The practices most often carried on in the small group sections, as reported by the students, were teacher-led discussions (4.98) and teachers giving help to individual students (4.65), though the later practice was carried on significantly more often with sophomores and juniors than with seniors ($p < .001$). The teacher was reported to lecture slightly less than half the time (3.64). Practices reported to occur "less than half the time" were:

a. students lead class in discussion (2.71),
b. the class studies or does homework (3.34), and
c. students give reports (2.74).

Practices reported to occur "rarely" were:

a. teacher leads class in recitation (2.08),
b. students do what they wish (2.05), and
c. teachers allow students to work elsewhere (2.43).

The students reported that "more than half of the time" the small group activities centered around the topic presented in the large group session (5.08).

Concerning student-student interaction, the students reported that they directed their comments or questions to other students "less than half the time" (3.08).

A further analysis of small group practices disclosed that:

a. seniors and juniors more often led the group in discussion than did the sophomores (2.87, 3.07, and 2.35), while the sophomores reported a greater frequency in teacher-led discussions than did the juniors and seniors (4.75, 4.70, and 5.20),

b. sophomores and juniors were more apt to study or do homework in small group meetings than seniors (2.91, 3.46, and 3.51),

c. seniors were less likely than the juniors or sophomores to discuss the topic under consideration in the large group session (4.74, 5.13, and 5.21),

d. juniors and seniors more often directed questions or comments to their classmates (3.19, 3.36, and 2.82),

e. sophomores were less likely to be allowed to work elsewhere (2.54, 2.67, and 2.17), and

f. the teachers offered individual help more frequently to the sophomores and juniors (3.93, 4.81, 5.06).

A significant difference ($p < .001$) between the perceptions of students and teachers was found on two items only. The teachers thought they did less leading of the discussion than did the students (3.43, 4.98), and the teachers thought they lectured less than the students reported (2.32, 3.64).

Two other questions pertained to the number of students who participated actively in small group sections, as perceived by students and teachers. The response choices here were: (7) all, (6) almost all, (5) most, (4) about half, (3) less than half, (2) a few, and (1) none. For the question, "How many of the students in your small group section generally participate in the discussions?," both students and teachers agree that most of the students do (4.35, 5.00).

For the question, "How many of the students in your small group sections occasionally lead discussions?," both students and teachers agreed that "less than half" occasionally lead discussions (2.80, 2.79). Juniors reported this practice to occur more often than did seniors or sophomores (2.69, 3.08, 2.61).

Small Group Sections: Problems

Students were asked to report to what extent they found different aspects of the small group sessions to be a problem. The response choices were: (5) it is no problem, (4) it is a minor problem, (3) it is somewhat of a problem, (2) it is a definite problem, and (1) it is a major problem.

The three problems reported by the students to be "somewhat" of a problem were:

a. a few students monopolize the discussion (3.33),
b. students don't know how to take an active part in small groups (3.24), and
c. some students seem afraid to contribute because of the reaction of others (3.15).

Slightly less of a problem is that "students are afraid to contribute because of the teacher's reaction" (3.61).

Three other possible problems were reported as only "minor problems" by the students:

a. the teacher tends to dominate the discussion (3.63),
b. the discussion tends to stray from the topic under consideration (3.92), and
c. the topic presented in large groups is not discussed in the small groups (3.99).

The short lengths of time for small groups (4.38) and the ability of all students to attend the entire period each time (4.21) were not considered to be problems.

The analysis of interactions disclosed the following:

a. Seniors reported that the teachers' tendency to dominate the discussion was more of a problem to them than did the sophomores and juniors (3.17, 3.73, 3.85).

b. Seniors, in general, feel that problems related to the items in this section exist to a greater extent than do sophomores or juniors (30.98, 33,83, 34.82).

The teachers' perceptions agreed with the students' on all items but two. The teachers felt there was less of a problem associated with a few students monopolizing the discussion than did the students (3.96, 3.33). The teachers also felt that the students' fear to contribute because of the reactions of others was less of a problem than the students perceived it to be (3.79, 3.15).

On the only item unique to the teacher questionnaire, the teachers felt that knowing how to deal effectively with small groups was a minor problem (4.10).

Supervised Study: Practices

Each student was asked to report his perception of how frequently he or other students participate in seven different practices during supervised study time. The response choices on the seven-point continuum were: (7) always, (6) almost always, (5) more than half the time, (4) about half the time, (3) less than half the time, (2) rarely, and (1) never.

"I study by myself" was the practice that students perceived as doing the most often (4.93). Seniors appear to do this most often and sophomores the least often, but all groups report this practice to occur "more than half the time."

Practices that occurred about half the time include working together on homework or projects (3.67), and talking, day dreaming or cutting up (3.83).

The other four practices were reported as taking place less than half the time. They were:

a. getting help from the teacher (3.27),
b. studying topics other than assigned (2.94),
c. recreational reading (3.11), and
d. doing more study in the subject than required (2.78).

It appears that there is a relationship between grade level and the frequency of studying topics other than assigned. The seniors reportedly do this most often and the sophomores do it least often. Sophomores and juniors reported working together on homework or projects more often than did seniors. Seniors, on the other hand, tend to talk, day dream, or cut up more often than the sophomores or juniors.

In all other respects, the findings were consistent for students at each grade level, both sexes, and students in the three ability levels. In this section the teachers' perceptions differed significantly from the students' perceptions more often than they did concerning the practices in large or small group meetings. The teachers perceived that the students received help from the teachers more often than the students reported they did (5.32, 3.27). This finding could be attributed to the possibility that teachers were often helping students, but were helping some students much more often than others. It is also possible that the amount of supervised study time is not sufficient to help each student individually to the extent he desires.

The teachers did not perceive that the students studied topics other than those assigned as often as the students reported they do (2.21, 2.94). The teachers also perceived that students do less recreational reading than was reported by the students (2.14, 3.11). The teachers also felt that the students spent less time in talking, day dreaming, or cutting up than the students reported (2.46, 3.83).

The students and teachers were also asked in the final section how many students they perceived to use their supervised study time for study purposes. Both the students and teachers reported that "half" to "most" of the students used this time for study (4.48, 4.25). The juniors perceived a slightly higher proportion than did seniors and sophomores (4.26, 4.55, 4.22).

Supervised Study: Problems

Students were asked to report on the degree to which eight aspects of supervised study are a problem for them. The five-choice response continuum was: (5) no problem, (4) minor problem, (3) somewhat of a problem, (2) definite problem, and (1) major problem.

The aspects of supervised study reported as being "somewhat of a problem" by the students are: (a) temptations to do things other than study (3.06), and (b) the teacher is not around to give help (3.20). The seniors reported both of these as a problem of significantly greater degree than did the sophomores, while the juniors agreed with the sophomores on the first and seniors on the second.

All other possible problems were rated as minor problems or less:

a. monopolization of the teacher by a few students (3.86),
b. not being encouraged to ask help of the teacher (3.90),
c. the lengths of time allotted to supervised study (4.01),
d. getting work organized (3.86),
e. unable to get materials needed (3.70), and
f. getting in the required amounts of supervised study with each teacher in the schedule (4.32).

Seniors and juniors reported more difficulty in getting their work organized than did sophomores (3.30, 3.51, 4.16). The other findings reported above were consistent for all three grade levels, both sexes, and the three ability groups.

The teachers differed significantly with the students on four problems related to supervised study time. The teachers felt that "teacher availability" (4.18) and "students not studying" (3.79) were lesser problems than the students perceived them to be. On the other hand, teachers felt that "students getting their work organized" (3.15) and "students scheduling an adequate amount of supervised study with the teachers" (3.79) were greater problems than perceived by the students.

For supervised study time there appears to be a consistent relationship between grade level and the degree of the problems related to the items in this section of the questionnaire. The problems appear to be greatest for the seniors and

least for the sophomores. However, except for "teacher availability" and "temptations to do other things than study," all student subgroups reported each problem to be only "somewhat of a problem" or less in degree.

Unscheduled Time: Practices

Unscheduled time is often called individual or independent study in other modularly scheduled schools. Many of the schools, in reporting on their experiences, have expressed the opinion that this aspect of the program provides more problems than any other. Because of the large number of things that students can do during this time, and the consequent large possibility for problems to arise, a greater number of questions on the questionnaire were asked concerning this phase of the program than any other.

Students were asked to report the frequency of twelve practices that might take place during unscheduled time. The seven-choice continuum was: (7) always, (6) almost always, (5) more than half the time, (4) about half the time, (3) less than half the time, (2) rarely, and (1) never.

The practices reported by students as occurring more often than others, "about half the time," were:

a. studying alone (3.95),
b. talking with other students about homework (3.84), and
c. shooting the breeze with friends (3.95)

These findings were consistent for all grade levels, all ability levels and for both sexes.

The teachers perceived that students study alone less often (3.23) than the students reported, and that students talk about homework with other students less often (3.19) than the students reported. On the other hand, the teachers perceived that the students "shoot the breeze" with friends more often (4.71) than was reported by the students.

Practices reported by students as occurring less than half the time but more than rarely are:

a. consulting a teacher for help (2.78),
b. working in laboratories and other areas (3.26),
c. working in the library using library materials (3.16),
d. studying topics other than homework (3.20),
e. studying some course topic in more depth than required (2.70)
f. doing recreational reading (3.34), and
g. wasting time (3.07).

The teachers agreed with the students on all of these except that the teachers perceived the students to "waste time" more frequently (4.03) than reported by the students.

Several of the results reported above were not consistent for all subgroups of students:

a. Sophomores and juniors reported using the laboratories and other work areas more frequently than the seniors (2.66, 3.37, 3.56). This was reported to occur more often by low ability students than by high ability students (3.55, 3.25, 3.01).
b. Juniors and seniors reported significantly greater use of the library than did the sophomores (3.39, 3.26, 2.88).
c. Boys reported that they study topics other than homework more often than the girls (3.41, 3.01).

The students reported that the amount of time spent working on activities (yearbook, student council, etc.) was between "rarely" and "less than half the time" (2.48). Seniors reported doing this the most often and sophomores the least (2.81, 2.56, 2.18). Teachers perceived this practice to occur more often (3.16) than the students reported.

The practice reported as carried on the least often (rarely) by the students was talking to a counselor (2.02). This practice was carried on more frequently by senior boys (2.30) than other subgroups, and least often by sophomore boys (1.78). The teachers perceived that students talked to the counselors more often (3.16) than the students reported.

The students and teachers were asked in the final section how many students used unscheduled time for study or other educational activities. The students reported that slightly more than half (4.16) of the students study while the teachers perceived this practice as being performed by slightly less than half of the students (3.56). The seniors perceived this practice to be carried out by a smaller proportion of the students than did juniors and sophomores (3.91, 4.16, 4.33).

For the question, "How many students should be scheduled solid to make the program most effective?" (i.e., take away unscheduled time from students who don't use it wisely), the students and teachers agreed that only "a few" or slightly more (2.14, 2.53) should be scheduled solid. The seniors felt that more students should be "scheduled solid" than did sophomores and juniors (2.51, 2.04, 1.99).

Unscheduled Time: Problems

Students were asked to report on the degree of the problems which they might encounter in using unscheduled time. Response choices for both students and teachers were: (5) no problem, (4) minor problem, (3) somewhat of a problem, (2) a definite problem, and (1) a major problem.

For almost every item there was a significant difference between students in different grade levels as to the degree of the problem. Interestingly enough, there were no significant differences in the degree of problems for students at different ability levels. Sex differences were found for a few of the items. The teachers,

in general, agreed with the average response of the students concerning the difficulties faced in using unscheduled time. On only three of the twelve items did the teachers report a significantly different perception than the students reported.

The problems of greatest degree to the students, ranking somewhere between "definite problems" and "somewhat of a problem," are:

a. students tempted to do other things than study (2.56), and
b. distractions caused by other students (2.78).

The teachers generally agreed with these ratings, though they felt that temptations to do other things than study was a greater problem (2.10) than the students reported. The seniors reported that temptations to do other things than study was a greater problem than perceived by the sophomores and juniors (2.17, 2.74, 2.67). Similarly, the seniors felt that distractions by other students was a greater problem than did the sophomores and juniors (2.40, 2.90, 2.95). The teachers also rated "lack of places for student study" as a greater problem (2.55) than did the students (3.19). The seniors and juniors reported this latter problem to be lesser than did the sophomores (3.60, 3.04, 2.77), and the girls reported it as a greater problem than the boys (2.93, 3.51).

On the average, the following problems were rated as minor:

a. unscheduled time periods are often too short (3.73),
b. laboratories and other rooms are not available (3.70),
c. students have trouble getting work organized (3.88),
d. teachers are not available to give students help (3.43),
e. students do not know what or where materials are available for use (3.84),
f. teachers do not encourage students to seek help (4.01),
g. counselors do not encourage students to seek help (4.01), and
h. the program for taking away a student's unscheduled time is unfair or doesn't help the student (3.46).

The teachers agreed with the students on all of these ratings except that the teachers felt that the students were having a greater problem in getting their work organized (2.74).

The students showed differences by grade level and/or sex on almost all of the above findings:

a. Seniors reported a greater problem in the lack of availability of laboratories and special rooms, while sophomores disclosed this as a relatively lesser problem (3.39, 3.68, 3.92).
b. Boys on all levels reported having greater problems getting their work organized than did girls (3.76, 4.00).
c. Teachers not being available was a greater problem for seniors than other students (3.02, 3.49, 3.68), and the girls reported this as a greater problem than did the boys (3.24, 3.65).
d. Seniors reported a greater problem with not knowing what or where materials are available for their use than did other students (3.37, 3.86, 4.12).
e. Seniors reported a greater problem in the lack of teacher encouragement to seek help while the sophomores disclosed this as a relatively lesser problem (3.69, 3.94, 4.23).

f. Seniors also reported a greater problem in the lack of encouragement from counselors to seek help while the sophomores reported this as a relatively lesser problem (3.69, 3.94, 4.23).

The students reported no problem associated with students on unscheduled time distracting classes that are in session (4.33). The teachers on the other hand felt that this is a minor problem (3.74).

General Problems of the Total Program

The students and teachers were also asked to rate the extent to which particular aspects of the program in general are problems for them. The rating scale was (5) no problem, (4) a minor problem, (3) somewhat of a problem, (2) a definite problem and (1) a major problem.

The problem areas along with the students' and teachers' ratings, respectively, are:

a. The school program is confusing to the students (4.32, 3.91).
b. The daily change in schedule hampers the development of regular study habits (4.47, 3.75).
c. There are too many distractions (3.87, 3.00).
d. Modular scheduling does not work well with all students (3.37, 3.16).
e. The daily change in schedule hampers systematic development of courses (4.37, 3.69)

For b, c, and e above, the teachers perceived a greater problem than did students ($p < .001$). Seniors reported c, d, and e to be greater problems than did the sophomores and juniors. However, except for d, the problems were rated on the average by the students to be minor or nonexistent. The teachers rated c and d as "somewhat of a problem."

The students and teachers were also asked for how many students and teachers the modular scheduling program works well. The response choices were: (7) all, (6) almost all, (5) most, (4) about half, (3) less than half, (2) a few, and (1) none.

The two questions, with the average responses for students and teachers, respectively, are:

a. For how many students does the modular scheduling program work well? (5.30, 4.56)
b. For how many teachers does the modular scheduling program work well? (5.46, 4.56)

The students feel that modular scheduling works well for most of the teachers and most of the students while the teachers rated both items between half and most. The seniors rated both items lower than other students (4.88, 5.35, 5.52 for the "students" item and 5.14, 5.39, 5.70 for the "teachers" item), but not as low as the teachers. The students in all ability levels were in agreement on the "teachers" item, but for the "students" item the low ability students feel that the modular system is effective for more students than do the high ability students (5.47, 5.31, 5.12).

The students generally feel that the modular system works well for "most" of the students and teachers, while teachers feel that it works well for "half" to "most" of the students and teachers. These findings are similar to those reported in 1965.

SUMMARY, CONCLUSIONS, AND COMPARISON TO 1965 STUDY FOR THE MODULAR SCHEDULE QUESTIONNAIRE

Large Group Sessions: Practices and Problems

The summary of large group practices in the 1965 Study indicated the following:

a. Lecturing was used by far the most often.
b. Audio-visual aids were used fairly extensively, but little use was made of outside resources.
c. Teachers perceived greater variation in presentation than the students perceived.
d. Teachers perceived more students paying attention than students did.

The 1968 evaluation reveals basically the same results. A few changes were noted. Teachers and students agree that "most" students pay attention whereas in 1965 the teachers reported "all" or "almost all" paying attention. Also to be noted is that, while students still perceive less variation in presentation than do the teachers, the difference is somewhat smaller than in 1965.

In the 1968 study the problems reported by teachers to be of greatest degree are the same as those found in the 1965 study, but the degree of the problem was reported as slightly less in 1968. These problems are:

a. lack of time to prepare materials and presentations, and
b. the variation in the abilities of students in a large group.

Only three of the five problems which were reported by students in 1965 to be of the greatest degree were reported as such in 1968. They are:

a. lack of variation,
b. distractions because of the size of the groups, and
c. the teacher "going too fast."

However, the degree of the problem for b and c above is not as high in 1968 as it was reported in 1965.

Two other problems which were reported to a significant degree in 1965, "not having discussion" and "not being able to ask questions," were reported only as minor problems in 1968.

The results of the 1968 evaluation and their comparison to the 1965 Study lead to these conclusions:

a. As reported in the 1965 Study, the practices in the large group sessions conform generally to the practices proposed by theorists. The current evaluation also provides evidence that the practices have improved slightly and are now more similar to those proposed by theorists.
b. The current evaluation, as well as the 1965 Study, does not disclose any widespread problems with large group sessions. Except for "lack of variation in presentation," the problems seem to be of slightly lesser degree in 1968 than in 1965. This might indicate that teachers are improving their use of large group sessions and/or students have different expectations of its function.
c. "Not being able to have discussion" and "not being able to ask questions" were reported as problems of lesser degree in 1968. If this reflects the students' increased understanding of the functional relationship between the use of small and large groups, then the students' expectations of the system are becoming more consistent with the theory. If, on the other hand, these

> problems were resolved by permitting more questions and discussions during the large group sessions, the functional relationship between large and small group meetings is being violated with respect to theoretical standards. Discussion, according to theory, should be reserved for small group sections where wide participation and discussion in depth can take place and should not interfere with the efficiency and dynamics of presentation which are the strengths of the large group session.

Small Group Sections: Practices and Problems

In 1965 the following summary was made about practices in the small group sections:

> The data show that some of the objectives of small group sessions were met while others were not. The responses to questions 2, 3, 5, and 6 indicate that the objectives of discussion, student leadership, student participation, pupil-teacher interaction, and student-student interaction were being met to some extent. On the other hand, the data indicate that lecturing occurred more often than the theory of use of small groups would warrant. The responses to question 4, "the class studies or does homework," indicate that the small groups often usurped the function of supervised study.

The results of the 1968 evaluation indicate that the above statement still holds true generally. One significant improvement is the agreement of students and teachers that "most" or "almost all" students participate in discussions, a significantly higher rating than was found for the students' responses in 1965. On the other hand, student leadership in class discussion was reported as more widespread in 1965 than in 1968.

In 1965 the biggest problem reported by students and teachers, with respect to small group sections, was the short length of time allotted to these meetings. After the report of the 1965 Study, the time allotted to small group sections was increased, and the 1968 results indicate that length of time is no longer a problem.

Monopolization of discussion by a few students continues to be "somewhat" of a problem in 1968 as it was in 1965, but of slightly greater degree. The problems of students not knowing how to take an active part in discussion, and not contributing for fear of the reactions of others was found to be "somewhat" of a problem in both 1965 and 1968, but of a slightly lesser degree in 1968.

In general, it seems that practices and problems reported in 1965 still hold true in 1968, with minor changes being in the direction of improvement, i.e., practices are more closely alligned with theory.

The amount of time devoted to lectures by the teacher, and study by the students, is not fully in accord with the best use of small group meetings in relationship to the theory of the use of large group presentations and supervised study sessions. If the theory of small group meetings in the modular system is the standard, then it seems that there is room for improvement. It does appear that the trend, though modest, is in that direction.

Supervised Study: Practices and Problems

The theory of modular scheduling proposes that supervised study time is scheduled "class" time so that teachers can provide help and encouragement for individual

students. The 1968 study disclosed findings similar to those found in 1965. The results of both evaluations show that students spend most of the time in studying by themselves or getting help from the teacher. The frequency of other reported practices is similar to those reported in 1965.

As in 1965, the teachers in 1968 perceived that the students get help from the teachers more often than the students reported they do. This finding could be attributed to the possibility that teachers are often helping students, but are helping some students much more often than others. It is also possible that not enough time is available for teachers to help each student as much as he desires.

Similar to 1965, the students in 1968 reported that they talk, day-dream, or cut-up a little less than half the time. Part of this day-dreaming, talking, and cutting-up is probably related to the report of the students that the problems of greatest degree in supervised study are "temptations to do other things than study" and "the teacher is not around to give help." Both were rated as "somewhat" of a problem on the average by the students, but the teachers preceived both problems to be "minor." Both of these problems were reported in 1965 to exist to a similar degree.

Not being able to get hold of needed materials was rated between "being somewhat of a problem" and "a minor problem." The 1968 evaluation suggests that there may be a slight increase in this problem since 1965. All other problems related to supervised study were reported to be slightly lesser in degree in 1968.

It can be concluded that supervised study time is being used, in general, along the lines recommended by theory. Some of the problems appear to have decreased since 1965, but lack of the availability of the teacher continues to be "somewhat" of a problem.

Unscheduled Time: Practices and Problems

The theory underlying unsupervised study time emphasizes the opportunity for students to learn to study independently and the opportunity for extensive use of learning materials and resources.

The most frequent practices reported by students in 1968 are "studying alone," "talking with other students about homework," and "shooting the breeze with friends." These same practices were rated highest in 1965 in the same order. The teachers reported in 1968 that "shooting the breeze" and "wasting time" are the most frequent practices.

The frequency of the other practices, as reported by the students, is similar to those reported in 1965 with a slight increase in consulting with teachers and using laboratories and special purpose rooms.

Both the students and the teachers reported that the problems, "temptations to do other things than study" and "distractions caused by other students," exist to a greater degree than any of the problems associated with the 1965 study. The students'

problem of getting their work organized seems to have decreased slightly from that reported in 1965.

In 1965, the teachers perceived that problems related to unscheduled time were of a greater degree than perceived by the students. In 1968, however, there is very little difference between teachers and students in this respect. Since the problems reported are very similar, on the basis of student reports, in the two studies, this indicates that the teachers perceive the problem to be of a slightly lesser degree in 1968.

In both 1965 and 1968, both the students and the teachers reported that a number of problems exist with unscheduled time. In spite of these problems, the students and the teachers reported practices which generally conform to the theory.

RESULTS OF THE MY HIGH SCHOOL OPINIONNAIRE

Following are the results for each of the 25 items on the My High School opinionnaire which was administered to all seniors at the experimental high school (N = 106) and a random sample of approximately half of the seniors at the control school (N = 98). High scores (the maximum is 7) reflect strong agreement with the statement, and low scores (the minimum is 1) reflect strong disagreement with the statement. A score of 4 reflects neither agreement nor disagreement.

The responses at the two schools were analyzed with a 2 x 3 x 2 factorial ANOVA. The factors in the design were (a) the two schools, (b) three ability levels (low, middle, and high), and (c) sex. The means and standard deviations for students at both schools on all items are found in Table VIII in the Appendix.

Item 1. In general, the students have a high respect for teachers. There is no difference in the extent to which students at the two high schools expressed respect for their teachers. This finding is consistent for all three ability levels and for both sexes.

	Mean	S.D.
Experimental School	4.16	1.38
Control School	3.87	1.29

Item 2. The students feel that the prime responsibility for their education lies with them. The students at the modularly scheduled high school feel more strongly ($p < .01$) than the students at the control high school that the prime responsibility for their education lies with them. This finding is consistent for the three ability groups and for both sexes.

	Mean	S.D.
Experimental School	5.13	1.16
Control School	4.59	1.62

Item 3. The students have many opportunities to influence what goes on in school. The students at the modularly scheduled high school feel more strongly that they have many opportunities to influence what goes on in school than do students at the control

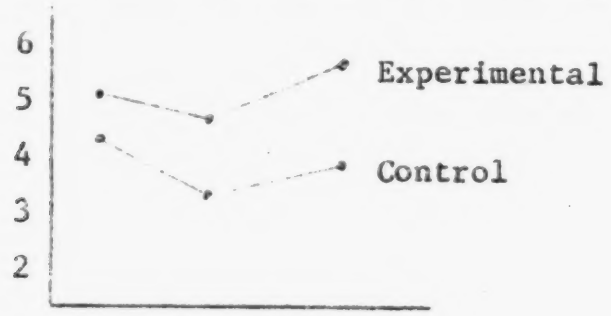
high school ($p < .001$). The low ability girls at the control high school feel that they have almost no opportunity to influence what goes on in school, whereas the low ability girls at the modularly scheduled high school feel relatively more strongly than other girls that they have many opportunities to influence what goes on in school.

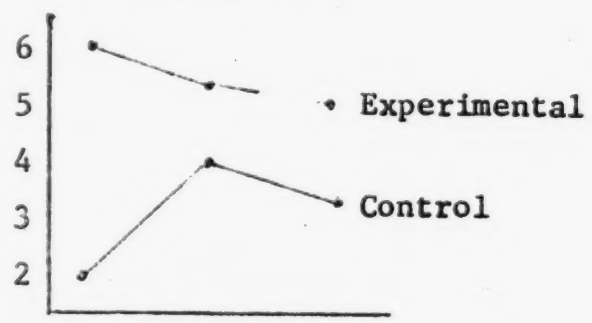
	Mean	S.D.
Experimental School	5.37	1.44
Control School	3.54	1.90

The means for the sex by ability level subgroups are:

	Low	Middle	High
Experimental School Boys	5.04	4.72	5.73
Control School Boys	4.38	3.27	3.79
Experimental School Girls	6.00	5.57	5.13
Control School Girls	2.00	4.00	3.26

These relationships can be expressed graphically as follows:





Item 4. The educational program has prepared the students well for their future. The students at the modularly scheduled high school feel more strongly than do the students at the control high school that the educational program has prepared them well for their future ($p < .001$). This finding is consistent for all three ability levels and the two sexes.

	Mean	S.D.
Experimental School	4.43	1.52
Control School	3.70	1.78

Item 5. The students have adequate opportunities to ask questions or raise points for discussion in the classroom. The students at the modularly scheduled high school have a stronger feeling than the students at the control high school that they have adequate opportunities to ask questions or raise points for discussion in the classroom ($p < .01$). This finding is consistent over the three ability levels and for both sexes.

	Mean	S.D.
Experimental School	5.48	1.22
Control School	4.96	1.41

Item 6. The teachers are concerned about the personal welfare of their students. There is no difference in the extent to which the students at the two high schools feel that the teachers are concerned for their personal welfare. This finding is consistent over all three ability levels and for both sexes.

	Mean	S.D.
Experimental School	3.86	1.47
Control School	3.72	1.90

Item 7. The school program has helped the students to learn to work together with other students on problems or projects. The students at the modularly scheduled high school felt more strongly than the students at the control school that the school program has helped them to learn to work together with other students on problems and projects ($p < .005$). This finding is consistent over the three ability levels and for both sexes.

	Mean	S.D.
Experimental School	4.60	1.38
Control School	4.10	1.61

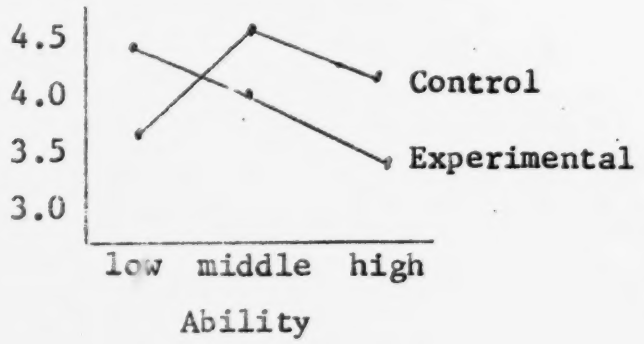
Item 8. There is adequate time and opportunity for students to get help from their guidance counselors. There is no difference in the extent to which students at the two schools feel there is adequate time and opportunity for students to get help from the guidance counselors. However, this finding is not consistent over the three ability groups. The low ability students at the modularly scheduled high school feel more strongly than the low ability students at the control high school that there is such time and opportunity. For the middle and high ability groups the students at the control high school feel more strongly than the students at the modularly scheduled high school that there is adequate time and opportunity to get help from the counselors.

	Mean	S.D.
Experimental School	3.99	1.95
Control School	4.28	1.89

The means of the students at the two schools by ability groups are:

	Low	Middle	High
Experimental School	4.45	3.93	3.42
Control School	3.60	4.56	4.26

This interaction is illustrated graphically as follows:



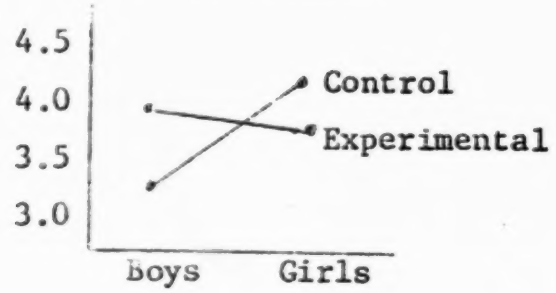
Item 9. The teachers keep students informed on how well they are doing in their courses. There is no difference in the extent to which students at the two schools feel that teachers keep students informed on how well they are doing in their courses. This finding is consistent over the three ability levels but not for both sexes. At the modularly scheduled high school there is no significant difference in the feelings of the boys and girls, but at the control high school the boys feel significantly less strongly than the girls that the teachers keep them informed on how well they are doing.

	Mean	S.D.
Experimental School	3.90	1.62
Control School	3.58	1.80

The means of the students at the two schools by sex are:

	Boys	Girls
Experimental School	3.96	3.83
Control School	3.26	4.15

Graphically, this interaction appears as follows:



Item 10. Classroom time is generally well spent. The students at the modularly scheduled high school feel significantly more strongly than the students at the control high school that classroom time is generally well spent ($p < .001$). This result is consistent over the three ability levels and for both sexes ($p < .001$).

	Mean	S.D.
Experimental School	4.31	1.30
Control School	3.39	1.63

Item 11. The school program provides opportunities for students to be creative and encourages them to show their creativity. The students at the modularly scheduled high school feel significantly more strongly than the students at the control high school that the school program provides opportunities for students to be creative and encourages them to show creativity ($p < .001$). This finding is consistent over the three ability levels and for both sexes ($p < .001$).

	Mean	S.D.
Experimental School	4.67	1.57
Control School	3.72	1.69

Item 12. The teachers have time to give individual attention to students that need or want help. The students at the modularly scheduled high school feel significantly more strongly than the students at the control high school that the teachers have time to give individual attention to students that need or want help ($p < .005$). This finding is consistent over the three ability levels and for both sexes.

	Mean	S.D.
Experimental School	4.47	1.49
Control School	3.76	1.62

Item 13. The students have a lot of interest in learning for its own sake, rather than for grades or credits. The students at both schools disagree with this statement, but the students at the control school disagree more strongly than the students at the modularly scheduled high school that they have a lot of interest in learning for its own sake ($p < .001$). This finding is consistent over the three ability levels and for both sexes.

	Mean	S.D.
Experimental School	3.12	1.60
Control School	2.19	1.58

Item 14. The school program has provided the students with opportunities and motivation to study certain topics in greater depth than is required in courses. The students at the modularly scheduled high school feel significantly more strongly than the students at the control high school that the school program provides students with these opportunities and motivation ($p < .001$). This finding is consistent over the three ability levels and for both sexes.

	Mean	S.D.
Experimental School	5.16	1.53
Control School	3.52	1.65

Item 15. The teachers keep classes alive and interesting by using a wide variety of methods for classroom activities. The students at both schools disagree with this statement, but the students at the control school disagree more strongly ($p < .001$). This finding is consistent over all three ability groups and for both sexes.

	Mean	S.D.
Experimental School	3.46	1.54
Control School	2.36	1.37

Item 16. The school program has provided the students with motivation and opportunities to study topics which are not included in normal coursework. The students at the modularly scheduled high school feel significantly more strongly than the students at the control school that such motivation and opportunities are provided ($p < .001$). This finding is consistent over the three ability levels and for both sexes.

	Mean	S.D.
Experimental School	5.12	1.52
Control School	3.40	1.56

Item 17. Attempts are continually made by the administration and the faculty to improve the school program for the benefit of students. The students at the modularly scheduled high school feel significantly more strongly than the students at the control high school that attempts to improve the school program are continually being made ($p < .001$). This finding is consistent over the three ability levels and for both sexes.

	Mean	S.D.
Experimental School	5.31	1.49
Control School	3.81	1.70

Item 18. The teachers in this school are generally very good teachers. The students at the modularly scheduled high school feel significantly more strongly than the students at the control high school that they have good teachers ($p < .001$). This finding is consistent over the three ability levels and for both sexes.

	Mean	S.D.
Experimental School	5.07	1.42
Control School	4.32	1.71

Item 19. The students have pride in their school. There is no difference in the extent to which the students at the two schools feel that the students have pride in this school. This finding is consistent over the three ability levels and for both sexes.

	Mean	S.D.
Experimental School	3.79	1.70
Control School	4.02	1.93

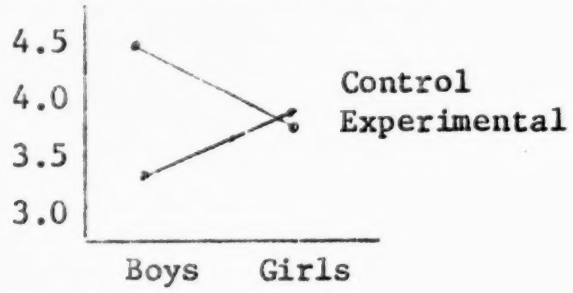
Item 20. The teachers work hard to motivate students to work at their full capacity. There is no difference in the extent to which students at the two schools feel that the teachers work hard to motivate students. This finding is consistent over the three ability levels, but not for both sexes. The boys at the modularly scheduled high school feel relatively more strongly than the students at the control school that the teachers work hard to motivate students, while the boys at the control nigh school feel relatively less strongly about this.

	Mean	S.D.
Experimental School	4.03	1.46
Control School	3.56	1.60

The means of the students at the two schools by sex are:

	Boys	Girls
Experimental School	4.47	3.72
Control School	3.33	3.87

This interaction is depicted on the following graph:



Item 21. The students generally enjoy going to school. The students at the modularly scheduled high school feel significantly more strongly than the students at the control high school that the students generally enjoy going to their school ($p < .001$). This finding is consistent over the three ability levels and for both sexes.

	Mean	S.D.
Experimental School	4.39	1.57
Control School	3.49	1.81

Item 22. The teachers provide opportunities for students to express opinions which are different than the teachers' viewpoint. There is no difference in the extent to which students at the two schools feel that the teachers provide opportunities for expression opinions different than the teachers'. This finding is consistent over the three ability levels and for both sexes.

	Mean	S.D.
Experimental School	4.69	1.49
Control School	4.56	1.75

Item 23. There is adequate time and opportunity to use the school library, laboratories, and other areas where materials for learning are available. The students at the modularly scheduled high school feel significantly more strongly than the students at the control school that there is adequate time and opportunity for using learning materials at the school ($p < .001$). This finding is consistent over the three ability levels and for both sexes.

	Mean	S.D.
Experimental School	5.48	1.37
Control School	3.41	1.80

Item 24. The students feel free to disagree with their teachers. There is no difference in the extent to which the students at the two schools feel that they are free to disagree with their teachers. This finding is consistent over the three ability levels and for both sexes.

	Mean	S.D.
Experimental School	4.82	1.70
Control School	4.58	1.89

Item 25. The teachers are available to help students with their learning problems. The students at the modularly scheduled high school feel more strongly than the students at the control high school that the teachers are available for helping students ($p < .05$). This finding is consistent over the three ability levels and for both sexes.

	Mean	S.D.
Experimental School	4.56	1.34
Control School	4.12	1.48

SUMMARY AND CONCLUSIONS OF THE MY HIGH SCHOOL OPINIONNAIRE

The students at the modularly scheduled high school reported more positive opinions and feelings for seventeen of the twenty-five items. On the remaining eight items the students at the two schools showed no difference.

The items on the questionnaire were developed to assess the opinions and attitudes toward three aspects of high school education: (a) opinions about the school program in general, (b) opinions about teachers and teaching practices, and (c) opinions about student responsibility for education and enjoyment of going to school.

For the twelve items which reflect opinions about teachers and teaching (items 1,5,6,8,9,10,15,18,20,22,24, and 25) the students at the modularly scheduled high school reported more positive opinions on only five items while no difference was found on seven items. But on items reflecting opinions about student responsibility for their own education and enjoyment of school (items 3, 13, and 21), the students at the experimental school were significantly higher on all three. For the ten items reflecting student attitudes toward the school program in general (items 3,4,7,11,12, 14,16,17,19, and 23), the students at the experimental school scored higher on all items but one. Thus it can be concluded from the My High School opinionnaire that the students at the experimental school have more positive opinions about their high school education, but these positive opinions are related more to the school program in general and student responsibility for education than to teaching and teaching practices.

These results tend to confirm the positive attitudes of the Broomfield students toward their school program as expressed on the Modular Schedule Questionnaire in both 1965 and 1968.

RESULTS OF THE STANDARDIZED TESTS

The Iowa Tests of Educational Development (ITED), the Brown-Holtzman Survey of Study Habits and Attitudes, and the Watson-Glaser Critical Thinking Appraisal were administered to the seniors at both high schools in April 1968. A 2 x 3 x 2 analysis of covariance was used to analyze the scores of the nine ITED subtests, the Watson-Glaser Appraisal, and the Brown-Holtzman Survey. The factors in the design were:

a. two treatment groups--modular schedule versus traditional high school organization,
b. three aptitude groups (as measured by the Lorge-Thorndike Intelligence Test)--low ability: I.Q. less than 110; middle ability: I.Q. of 110-120; and high ability: I.Q. above 120, and
c. two sex groups--boys and girls.

The two treatment groups were included in the factorial design to compare the effects of the modular schedule organization with the traditional school organization. The aptitude and sex groups were incorporated into the analysis to detect interactions between the treatments and those variables.

The means of the ITED subtests in each cell of the factorial design were adjusted for differences that existed among the cells on the ninth grade administration of the ITED. Two scores from the ninth-grade administration of the ITED were used to adjust the dependent variable in each cell: (a) the score from the same subtest, and (b) the composite score on the ITED. The adjusting variable for the Watson-Glaser Critical Thinking Appraisal and the Brown-Holtzman Survey of Study Habits and Attitudes was the total score of the ninth grade administration of the Lorge-Thorndike Intelligence Tests.

Since the ninth-grade administrations of the ITED and Lorge-Thorndike Intelligence Tests were used as covariates, only those students who attended the two high schools for all three years were included in the analysis of the standardized tests. Thus the results show the cumulative effect of a three-year exposure to a modular schedule organization and a traditional high school organization.

In reporting the analyses of the eleven test scores, only the treatment main effects and the interactions with the treatment effects will be presented. The other main effects and interactions are not directly relevant to this study. Table IX in the Appendix gives the means of each of the dependent variables and the covariates for each school.

Iowa Tests of Educational Development

There is no significant difference between the two schools or interactions with treatment effects for the following subtests in the ITED battery:

1. Understanding of Basic Social Concepts
2. Background in the Natural Sciences
4. Ability to Do Quantitative Thinking
6. Interpretation: Natural Sciences
7. Interpretation: Literature
8. General Vocabulary

Significant differences in treatment effects and/or interactions were found for the following tests:

3. Correctness and Appropriateness of Expression. The students at the modular high school scored significantly higher ($p < .01$) than the control high school on the measure of correctness and appropriateness of expression (cf., Table X in the Appendix). This result is consistent over the three ability groups but not for both sexes. The girls at the modular scheduled high school scored very significantly higher than the girls at the control school, but the boys at the two schools did not differ significantly from each other.

5. Interpretation: Social Studies. The students at the modularly scheduled high school performed very significantly higher ($p < .001$) than the students at the control high school on the ability to interpret social studies materials (cf., Table XI in the Appendix). This result is consistent over the three ability groups and for both sexes.

9. Use of Sources of Information. The students at the modularly scheduled high school performed very significantly higher ($p < .001$) than the students at the control high school on the measure of use of sources of information (cf., Table XI in the Appendix). This finding is consistent over the three ability levels and for both sexes.

Watson-Glaser Critical Thinking Appraisal

No significant difference was found between the two schools in critical thinking ability. This finding is consistent over the three ability groups and for both sexes.

Brown-Holtzman Survey of Study Habits and Attitudes

No significant difference was found between the two schools for the students' reports of their study habits and attitudes. This finding is consistent over the three ability groups and for both sexes.

COMPARISON OF THE RESULTS OF THE STANDARDIZED TESTS TO THE 1965 STUDY

Iowa Tests of Educational Development

In the 1965 Study the ITED battery was administered to only the sophomores and juniors. When the data for the two classes were analyzed together, a difference was found for one of the subtests, Test 5 (Ability to Interpret Social Studies Materials), in favor of the experimental school. The same result was found in the current evaluation for the seniors.

In the 1965 Study the test scores for the sophomores and juniors were also analyzed separately. For the sophomores, the experimental school was superior to the control school on six of the nine subtests (Tests 2,3,5,6,7,9). One of the purposes of this study was to find out if this superiority of the experimental school would be maintained after three years of experience with the modular system. The current evaluation shows that the superiority of the students at Broomfield was maintained on three of these tests: Test 3 (Correctness and Appropriateness of Expression), Test 5 (Interpretation: Social Studies), and Test 9 (Uses of Sources of Information).

The results of the two evaluations generally indicate that the modularly scheduled high school is equal to or better than the control high school in academic achievement. It is not known if the better performance of the experimental school on certain

tests can be attributed to the modular system or to other factors that were not controlled in the two evaluations.

Watson-Glaser Critical Thinking Appraisal

The 1965 Study showed the experimental school to be superior in critical thinking ability to the control school for all three grade levels. However, the results of the current evaluation do not support this finding.

Brown-Holtzman Survey of Study Habits and Attitudes

The current evaluation did not disclose any significant difference between the seniors at the two schools in self-reported study habits and attitudes. This result is also consistent with the findings of the 1965 Study where no significant difference was found between the two schools for any of the three grade levels.

GENERAL CONCLUSIONS

Although the practices at Broomfield High School during 1968 were somewhat more consistent with theory than was disclosed in the 1965 Study, the students and teachers still do not fully use, or possibly understand, some of the opportunities for improving the educational program which are made possible with a modular system.

The use of large group sessions for discussion or for individual study, though not used frequently at Broomfield, appears to be practiced more often than is consistent with theory. Large group sessions should be used almost solely for presentation. Discussion, according to theory, should be reserved for small group sections where wide participation and discussion in depth can take place. The use of small group sections for study purposes, while not practiced widely, was reported to occur often enough to suggest that small group practices also are not completely consistent with the theory of the modular system. The most effective practices for small group sections are pupil-teacher interaction, pupil-pupil interaction, group projects, and analytical and exploratory discussion. Individual study, of course, should be reserved for supervised or unsupervised study time.

In spite of the shortcomings noted above, the reported practices at Broomfield High School are generally in agreement with the theory of the modular system. The 1968 results, while similar to the findings in 1965, indicate a slight trend toward greater consistency with expected practices.

While the reported problems remain similar to those disclosed in 1965, the current evaluation found that low ability students reported their problems to be of a lesser degree than was reported in 1965. This suggests that some improvement has been made in making the program work for low ability students. Very few problems were found to be of a greater degree in 1968 than in 1965, and a number of problems were reported

to be of slightly lesser degree. This indicates a trend toward improvement in the use of the modular system at Broomfield.

As in 1965, both the students and the teachers have strong favorable attitudes toward the school program. Additional support for the modular system was provided by the more favorable opinions of the school program, as measured by the My High School opinionnaire, in comparison to the control school.

The test results disclosed that the students at the modularly scheduled high school perform as well or better than students in a school with a traditional schedule. However, the superiority in critical thinking, disclosed in 1965, was not maintained in 1968.

The conclusions can be summed up by saying that Broomfield's program, generally good in 1965, has maintained about the same level of quality with slight improvements in certain areas of the modular system. The opinions of the school program are highly favorable, and growth in academic achievement is equal to or greater than the achievement at a relatively comparable control school in the same school district.

REFERENCES

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Speckhard, Gerald P. An Evaluation of the Education Program of a High School Using a Modular Schedule. Unpublished doctoral dissertation, University of Colorado, 1966. (Available from University Microfilms, Ann Arbor, Michigan.)

NOTE

Copies of the instruments used in this evaluation are available from:

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TABLE III

MEANS FOR STUDENTS (BY SUBGROUPS) AND FACULTY AT BROOMFIELD HIGH SCHOOL ON MODULAR SCHEDULE QUESTIONNAIRES: LARGE GROUP SESSIONS

	Grade 10			Grade 11			Grade 12			Faculty
Item	low	middle	high	low	middle	high	low	middle	high	
LARGE GROUP SESSIONS: PRACTICES										
1.	5.92	6.22	6.12	5.77	6.02	6.11	5.76	5.90	6.04	4.89
2.	1.92	2.02	2.16	2.37	2.23	2.29	1.97	1.96	1.92	2.11
3.	2.33	2.26	2.45	2.63	2.09	2.41	2.48	2.46	2.23	3.07
4.	2.46	2.13	2.06	2.60	2.15	1.97	2.88	2.42	1.88	1.71
5.	2.98	3.04	3.18	2.40	2.30	2.68	2.76	3.04	2.46	2.39
6.	5.59	5.91	5.76	5.20	5.47	5.83	3.64	3.71	4.00	3.79
7.	2.03	1.96	2.20	1.93	2.06	2.33	2.24	2.08	1.69	2.04
8.	3.02	2.83	2.29	2.87	2.72	2.83	2.79	2.77	2.50	2.68
9.	2.85	2.11	1.82	2.43	2.43	2.00	3.52	3.94	2.81	2.82
10.	4.61	3.35	3.75	4.27	3.13	3.70	4.27	4.19	4.46	4.57
11.	2.34	1.94	2.18	3.03	2.38	2.54	2.61	2.50	1.96	2.29
12.	2.98	2.83	2.69	3.17	2.34	2.51	3.61	2.83	2.54	2.86
13.	3.33	2.39	2.89	3.50	2.68	2.51	3.52	3.25	2.12	3.64
LARGE GROUP SESSIONS: PROBLEMS										
14.	3.69	4.31	4.10	4.10	4.09	4.21	3.70	4.02	4.15	3.96
15.	4.52	4.76	4.82	4.70	4.70	4.78	4.09	4.60	4.62	4.54
16.	4.46	4.43	4.61	4.77	4.55	4.62	4.06	4.46	4.50	4.32
17.	2.92	3.41	3.31	3.17	3.72	3.70	3.03	3.31	3.15	4.07
18.*	3.77	3.76	3.86	3.70	3.70	3.76	3.36	3.73	3.88	3.96
19.*	3.26	2.85	3.20	3.37	2.96	3.30	3.24	3.35	3.42	3.50
20.*	3.52	3.72	4.06	3.90	3.85	3.79	3.45	3.77	3.92	3.64
21.*	3.00	2.89	3.31	3.17	2.98	2.78	2.88	3.04	2.08	3.89

* This item is different on the student questionnaire and the teacher questionnaire.

TABLE IV

MEANS FOR STUDENTS (BY SUBGROUPS) AND FACULTY AT BROOMFIELD HIGH SCHOOL ON MODULAR SCHEDULE QUESTIONNAIRES: SMALL GROUP SESSIONS

	Grade 10			Grade 11			Grade 12			Faculty
Item	low	middle	high	low	middle	high	low	middle	high	
SMALL GROUP SESSIONS: PRACTICES										
22.	3.95	3.70	3.76	3.80	3.66	3.30	4.15	3.38	3.00	2.32
23.	2.54	2.28	2.18	3.53	2.87	2.90	2.61	2.94	3.12	3.11
24.	4.92	5.39	5.29	4.93	5.26	4.63	4.97	4.83	4.27	3.43
25.	4.02	3.28	3.14	3.40	3.38	3.59	3.27	2.81	2.62	2.75
26.	2.82	2.63	2.82	2.83	2.72	2.84	2.67	2.71	2.35	2.64
27.	2.74	2.06	1.82	2.40	2.06	1.71	2.42	1.96	1.46	2.39
28.	4.97	4.56	4.86	5.40	4.87	4.98	4.27	3.75	3.73	4.59
29.	2.10	1.81	2.04	2.07	2.00	2.29	2.18	1.98	1.85	2.10
30.	4.97	5.04	5.47	5.37	5.30	5.16	4.73	4.88	4.50	5.14
31.	2.18	2.00	2.29	3.07	2.43	2.68	2.61	2.67	2.23	2.39
32.	2.97	2.70	2.59	3.73	3.30	3.29	3.00	3.25	3.27	3.04
SMALL GROUP SESSIONS: PROBLEMS										
33.	3.62	3.59	3.29	3.30	3.11	3.57	2.94	2.98	3.12	3.96
34.	3.89	3.91	3.75	3.83	3.66	3.75	3.36	3.27	2.73	3.54
35.	3.49	3.28	3.00	3.63	3.30	3.32	2.70	3.15	3.23	3.43
36.	4.33	4.76	4.63	4.37	4.43	4.43	3.73	4.08	4.35	4.55
37.	3.93	4.20	4.04	3.87	3.98	4.00	3.55	3.67	3.81	4.29
38.	4.26	4.33	4.41	4.27	4.38	4.29	3.79	3.88	4.00	4.10
39.*	3.67	3.54	4.06	3.90	3.74	3.46	3.12	3.40	3.46	4.10
40.	3.23	3.17	3.55	3.23	3.11	3.17	2.73	2.98	3.00	3.79
41.*	4.02	4.15	4.27	3.60	3.91	4.02	3.58	3.96	4.15	4.17

* This item is different on the student questionnaire and the teacher questionnaire.

TABLE V

MEANS FOR STUDENTS (BY SUBGROUPS) AND FACULTY AT BROOMFIELD HIGH SCHOOL ON MODULAR SCHEDULE QUESTIONNAIRES: SUPERVISED STUDY

	Grade 10			Grade 11			Grade 12			Faculty
Item	low	middle	high	low	middle	high	low	middle	high	
SUPERVISED STUDY: PRACTICES										
42.	4.63	4.62	4.75	4.90	4.78	5.10	5.03	5.33	5.58	4.54
43.	3.58	3.02	3.33	3.33	3.31	3.29	3.36	3.21	2.69	5.32
44.	2.41	2.74	2.88	2.73	2.89	3.15	3.06	3.33	3.58	2.21
45.	3.10	3.34	2.88	2.87	2.93	3.05	2.97	3.63	3.04	2.14
46.	3.88	3.68	3.61	3.90	3.98	3.98	3.39	2.96	3.35	3.36
47.	3.59	3.75	3.67	3.93	3.76	3.52	4.12	4.42	4.19	2.46
48.	2.73	2.66	2.84	3.17	2.78	2.79	2.76	2.88	2.46	2.64
SUPERVISED STUDY: PROBLEMS										
49.	3.76	4.19	3.98	3.73	3.72	4.03	3.30	3.83	3.85	4.04
50.	3.15	3.09	3.08	3.20	3.09	3.31	2.76	2.94	2.50	3.79
51.	3.51	3.49	3.45	3.47	2.91	2.87	3.03	2.92	3.08	4.18
52. *	4.03	4.02	4.08	4.03	3.59	3.97	3.64	3.80	3.81	2.96
53.	4.00	4.04	4.39	4.10	4.04	3.79	3.39	4.06	4.27	4.04
54.	3.71	4.11	3.92	3.73	3.87	4.02	3.70	3.69	3.85	3.15
55.	3.98	4.38	4.10	3.60	3.37	3.54	3.12	3.48	3.12	3.56
56.	4.22	4.40	4.45	4.33	4.41	4.51	3.67	4.17	4.69	3.79

* This item is different on the student questionnaire and the teacher questionnaire.

TABLE VI

MEANS FOR STUDENTS (BY SUBGROUPS) AND FACULTY AT BROOMFIELD HIGH SCHOOL ON MODULAR SCHEDULE QUESTIONNAIRES: UNSCHEDULED TIME

	Grade 10			Grade 11			Grade 12			Faculty
Item	low	middle	high	low	middle	high	low	middle	high	
				UNSCHEDULED TIME: PRACTICES						
57.	3.97	3.74	3.82	4.07	3.90	4.00	3.88	4.21	4.00	3.23
58.	2.83	2.57	2.78	3.03	2.79	2.79	3.00	2.83	2.42	3.06
59.	1.95	1.94	1.82	2.27	1.83	2.02	2.21	2.25	2.08	2.63
60.	3.82	3.55	3.27	3.97	3.38	3.11	2.70	2.79	2.27	3.29
61.	2.82	2.94	2.94	3.57	3.38	3.11	3.39	3.42	3.35	3.26
62.	3.02	3.28	2.96	3.20	3.23	3.42	3.09	3.33	3.31	2.81
63.	3.65	4.13	3.73	4.20	3.90	3.85	3.88	3.54	3.92	3.19
64.	2.40	2.64	2.84	2.63	2.75	2.90	2.73	2.75	2.58	2.48
65.	3.20	3.49	3.12	3.07	3.38	3.44	2.94	3.83	3.46	3.10
66.	4.13	3.89	3.51	3.87	3.85	3.74	4.42	4.23	4.19	4.71
67.	3.10	2.96	2.78	3.03	2.85	3.11	3.27	3.17	3.62	4.03
68.	2.07	1.98	2.45	2.83	2.48	2.56	2.61	2.83	3.08	3.16
				UNSCHEDULED TIME: PROBLEMS						
69.	3.83	3.85	3.53	3.47	3.60	4.05	3.24	3.94	3.58	3.52
70.	3.57	3.60	3.59	3.00	2.96	3.15	2.70	2.92	2.65	2.55
71.	2.68	2.72	2.65	2.67	2.69	2.77	2.21	2.33	1.77	2.10
72.	2.87	3.00	2.96	2.80	2.81	2.98	2.58	2.40	2.19	2.32
73.	3.80	3.84	4.02	3.87	3.69	3.58	3.45	3.42	3.23	3.52
74.	3.83	3.96	3.86	4.00	3.75	4.23	3.42	3.83	3.73	2.74
75.	3.68	3.81	3.51	3.73	3.23	3.52	2.97	2.96	3.15	3.16
76.	4.08	4.26	4.08	4.00	3.71	3.87	3.30	3.42	3.35	3.55
77.	4.17	4.26	4.31	4.20	3.75	4.03	3.48	3.73	3.88	3.84
78.	4.42	4.36	4.20	4.23	3.73	4.02	3.55	3.71	3.31	3.90
79.	4.42	4.58	4.45	4.23	4.56	4.45	3.64	4.02	4.15	3.74
80.	3.38	2.85	3.73	3.00	3.46	3.39	3.55	4.00	4.00	3.80

TABLE VII

MEANS FOR STUDENTS (BY SUBGROUPS) AND FACULTY AT BROOMFIELD HIGH SCHOOL ON MODULAR SCHEDULE QUESTIONNAIRES: GENERAL PROBLEMS AND OBSERVATIONS

	Grade 10			Grade 11			Grade 12			Faculty
Item	low	middle	high	low	middle	high	low	middle	high	
				GENERAL: PROBLEMS						
81.	4.52	4.41	4.27	4.33	4.46	4.29	4.06	4.31	3.92	3.91
82.	4.43	4.80	4.31	4.53	4.60	4.55	4.33	4.33	4.15	3.75
83.	4.00	4.17	3.82	3.67	4.06	4.18	3.45	3.60	3.15	3.00
84.	3.90	3.74	3.20	3.30	3.60	3.42	2.85	2.94	2.42	3.16
85.	4.45	4.57	4.29	4.33	4.42	4.53	4.00	4.33	4.04	3.69
				GENERAL: OBSERVATIONS						
86.	5.68	5.54	5.29	5.50	5.29	5.32	5.06	5.08	4.31	4.56
87.	5.72	5.72	5.67	5.70	5.38	5.29	5.00	5.31	5.00	4.56
88.	4.43	4.85	4.59	4.43	4.65	4.65	3.85	4.23	4.23	4.25
89.	4.48	4.24	3.90	4.73	4.48	4.55	4.30	4.19	4.38	5.00
90.	3.03	2.24	2.47	3.53	2.83	3.08	2.61	2.69	2.88	2.79
91.	4.27	4.44	4.25	4.33	4.25	4.02	3.97	3.90	3.88	3.56
92.	5.08	5.24	5.31	4.43	4.90	4.73	4.58	5.19	4.81	5.03
93.	1.98	1.74	2.25	1.90	2.21	2.00	2.36	2.33	2.96	2.53

TABLE VIII

MEANS AND STANDARD DEVIATIONS FOR SENIORS AT THE TWO SCHOOLS ON MY HIGH SCHOOL OPINIONNAIRE*

	EXPERIMENTAL SCHOOL (N = 106)		CONTROL SCHOOL (N = 98)	
Item	Mean	S.D.	Mean	S.D.
1	4.16	1.38	3.87	1.29
2	5.13	1.16	4.59	1.62
3	5.37	1.44	3.54	1.90
4	4.43	1.52	3.70	1.78
5	5.48	1.22	4.96	1.41
6	3.86	1.47	3.72	1.90
7	4.60	1.38	4.10	1.61
8	3.99	1.95	4.28	1.89
9	3.90	1.62	3.58	1.80
10	4.31	1.30	3.39	1.63
11	4.67	1.57	3.72	1.69
12	4.47	1.49	3.76	1.62
13	3.12	1.60	2.19	1.58
14	5.16	1.53	3.52	1.65
15	3.46	1.54	2.36	1.37
16	5.12	1.52	3.40	1.56
17	5.31	1.49	3.81	1.70
18	5.07	1.42	4.32	1.71
19	3.79	1.70	4.02	1.93
20	4.03	1.46	3.56	1.60
21	4.39	1.57	3.49	1.81
22	4.69	1.49	4.56	1.75
23	5.48	1.37	3.41	1.80
24	4.82	1.70	4.58	1.89
25	4.56	1.34	4.12	1.48

*To avoid negative numbers, the responses to the items were transformed as follows: -3 = 1, -2 = 2, -1 = 3, 0 = 4, +1 = 5, +2 = 6, +3 = 7.

TABLE IX

MEANS AND STANDARD DEVIATIONS FOR SENIORS AT THE TWO SCHOOLS ON THE DEPENDENT VARIABLES (POST-TESTS) AND COVARIATES (PRETESTS) USED IN THE ANALYSIS OF STANDARDIZED TESTS

	EXPERIMENTAL SCHOOL			CONTROL SCHOOL		
Pretests* (9th grade)	N	Mean	S.D.	N	Mean	S.D.
Lorge-Thorndike	116	113.2	11.4	196	117.4	11.4
ITED TEST 1	95	15.6	4.6	57	15.9	4.5
ITED TEST 2	95	17.5	5.1	58	17.1	5.1
ITED TEST 3	95	15.1	4.1	58	16.9	3.8
ITED TEST 4	95	14.4	5.2	58	15.7	5.1
ITED TEST 5	95	15.5	4.8	57	17.2	5.8
ITED TEST 6	95	16.1	5.4	57	16.4	5.3
ITED TEST 7	95	15.2	4.8	57	16.3	4.4
ITED TEST 8	95	16.5	4.6	51	16.3	4.6
ITED TEST 9	95	17.0	5.8	52	16.5	5.2
ITED COMPOSITE	95	16.5	4.5	128	17.0	4.6
Post Tests* (12th grade)						
ITED TEST 1	105	39.6	9.2	95	41.2	9.5
ITED TEST 2	100	36.4	9.3	95	37.9	9.4
ITED TEST 3	105	51.4	11.3	87	50.4	12.8
ITED TEST 4	93	18.1	5.8	96	19.8	6.4
ITED TEST 5	105	30.4	9.3	88	26.4	9.4
ITED TEST 6	93	32.3	9.2	86	31.6	10.3
ITED TEST 7	100	38.9	11.5	86	38.5	11.1
ITED TEST 8	105	57.1	11.3	82	56.1	12.6
ITED TEST 9	108	40.4	9.0	82	36.5	12.4
Brown-Holtzman	106	26.4	10.0	98	25.6	10.3
Watson-Glaser	106	61.9	9.2	72	62.2	12.1

*ITED pretests are recorded in standard scores and ITED post-tests are recorded in raw scores.

TABLE X

F-RATIOS FOR ANALYSIS OF COVARIANCE FOR ITED SUBTEST 3: CORRECTNESS AND APPROPRIATENESS OF EXPRESSION

SV	df	F	P
Treatment (T)	1	8.11	<.01
Aptitude (A)	2	3.23	<.05
Sex (S)	1	1.41	
T x A	2	<1	
T x S	1	7.00	<.01
A x S	2	<1	
T x A x S	2	<1	
Error	128		

Error Mean Square = 41.53

TABLE XI

F-RATIOS FOR ANALYSIS OF COVARIANCE FOR ITED SUBTEST 5: INTERPRETATION: SOCIAL STUDIES

SV	df	F	P
Treatment (T)	1	23.51	<.001
Aptitude (A)	2	3.12	<.05
Sex (S)	1	<1	
T x A	2	<1	
T x S	1	3.41	
A x S	2	1.43	
T x A x S	2	2.62	
Error	130		

Error Mean Square = 30.03

TABLE XII

F-RATIOS FOR ANALYSIS OF COVARIANCE FOR ITED SUBTEST 9: USE OF SOURCES OF INFORMATION

SV	df	F	P
Treatment (T)	1	18.73	<.001
Aptitude (A)	2	1.23	
Sex (S)	1	5.61	<.025
T x A	2	1.07	
T x S	1	<1	
A x S	2	<1	
T x A x S	2	<1	
Error	125		

Error Mean Square = 44.69